A Look at the US Process-Heating Industry: Today and Tomorrow

DOE/IHEA Materials Forum
February 5-6, 2003
Oak Ridge National Laboratory

IHEA

The Industrial Heating Equipment Association, founded in 1929, is a trade association comprised of designers and manufacturers of industrial furnaces and ovens, combustion equipment, process, other materials and components, and professional service members for industrial furnaces and ovens.

Thermal Technology

IHEA

IHEA members, with sales of $0.7 billion dollars per year, share in common goals of making the process heating industry stronger and more progressive to meet the needs of companies using thermal process equipment.

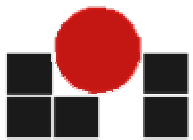
Primary Excellence Goals

- Define and promote the common business interests of the industrial heat processing industry
- Provide leadership for sustained growth of the industry, for IHEA members and for other stakeholders through the promotion of advanced technology, partnerships and alliances with organizations, institutions and government funded activities.
- Promote the industry to attract high quality personnel and provide continuing education in technology, processes, and training for entrepreneurial development

2003 IHEA Members

Custom Electric Manufacturing Co

2003 IHEA Members



2003 IHEA Members

Welcomes

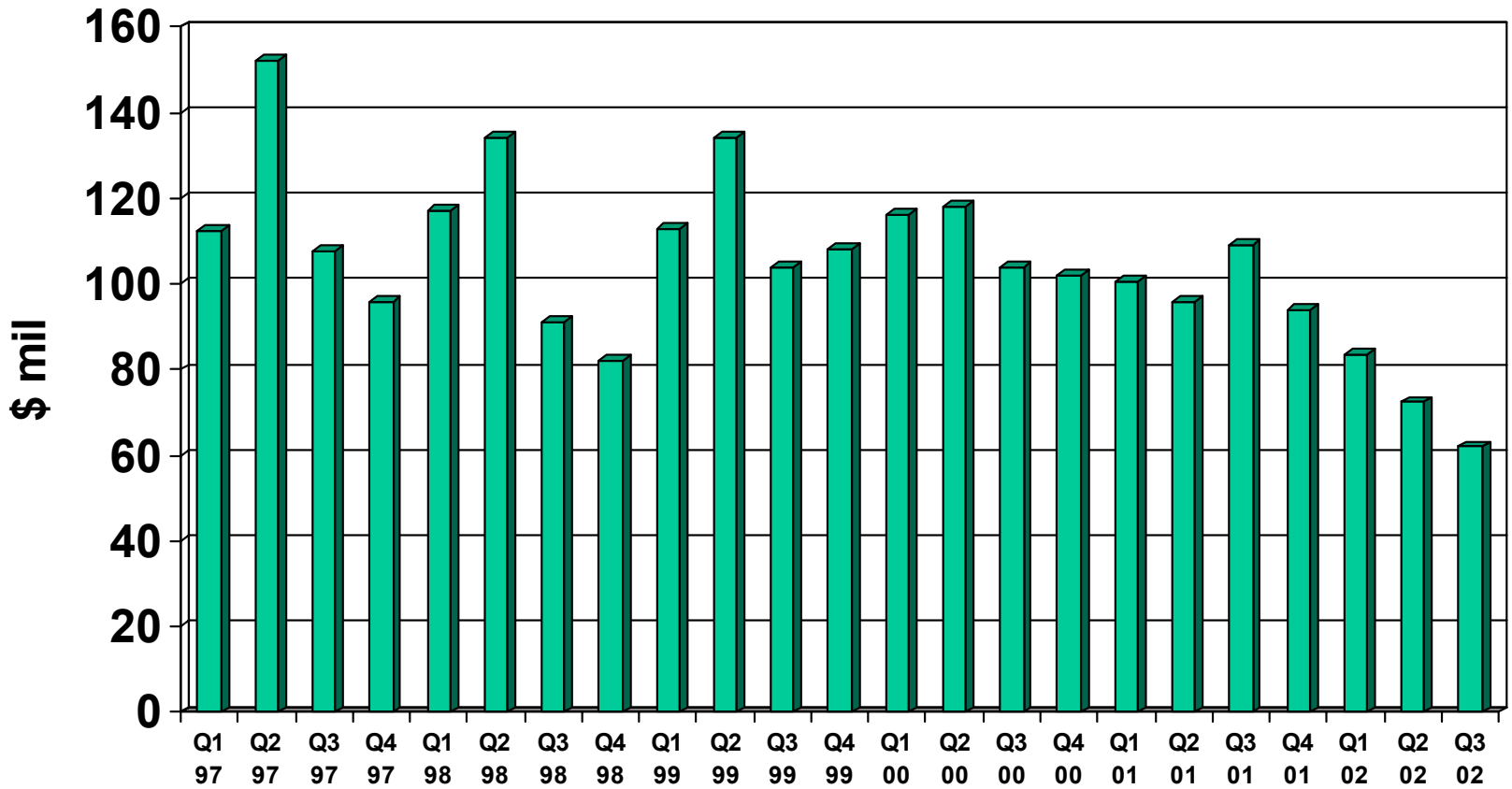
IREA

as a Product Division in January, 2003.

Economic Situation

- Industrial heating equipment decline 19% due to lower demand:
  - Aerospace
  - Automotive
  - Tool & Die
  - Commercial Heat Treaters
- Machine tool industry has seen orders decline 40%

IHEA Total Orders



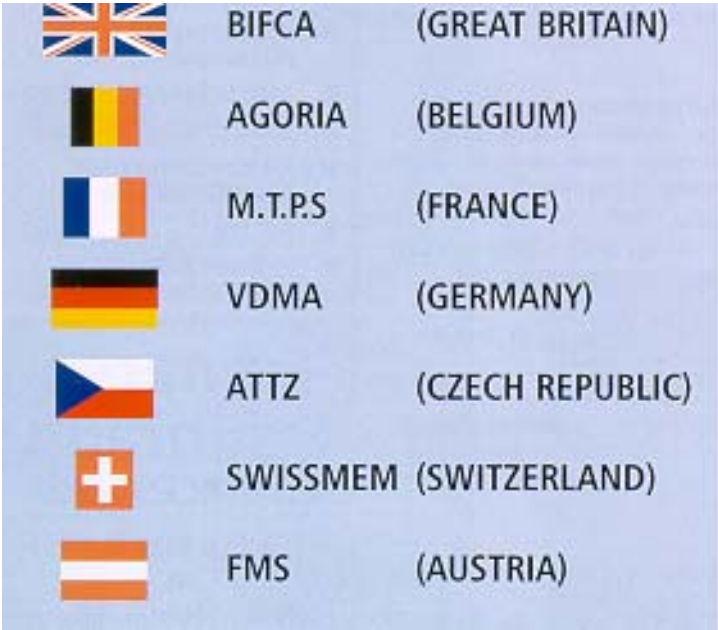
Industrial Process Furnace & Oven Manufacturing

$000's

	2001	2000	V%
Exports	953	1191	(20%)
Imports	481	537	(10%)
	1434	1728	(17%)

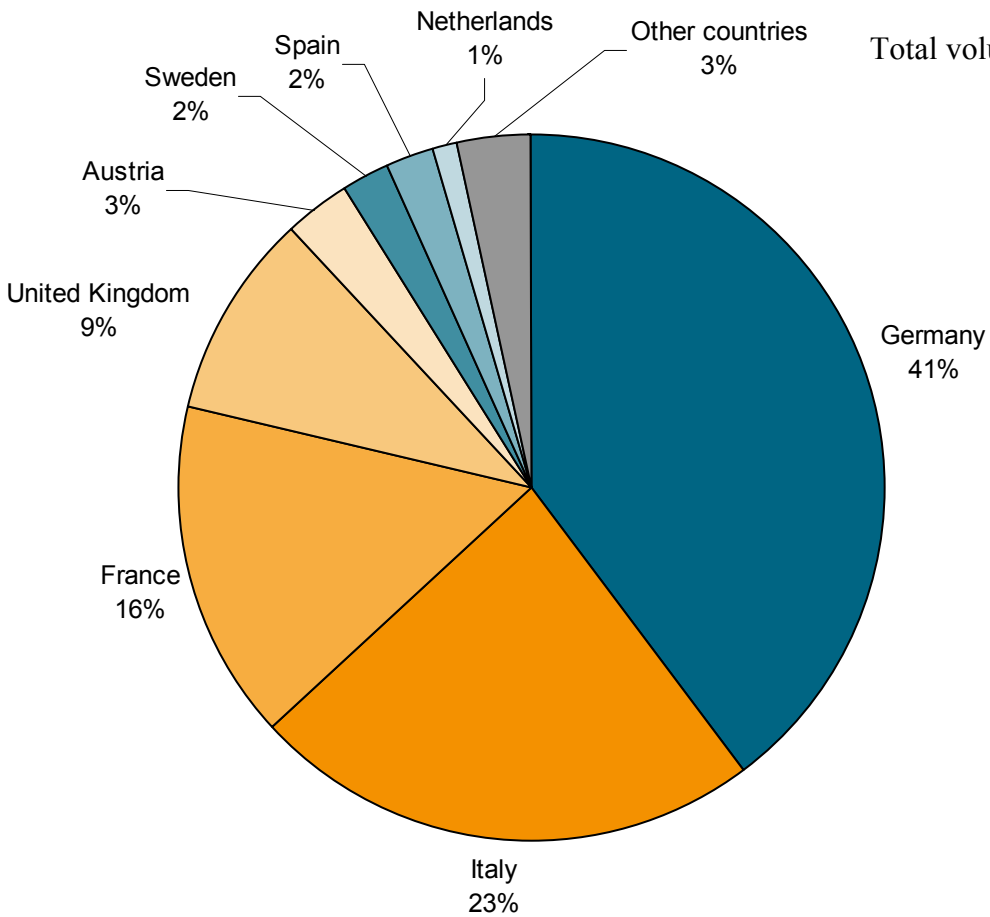
Source: US Department of Commerce

CECOF Members



- 140 companies, of which 80 are domiciled in Germany

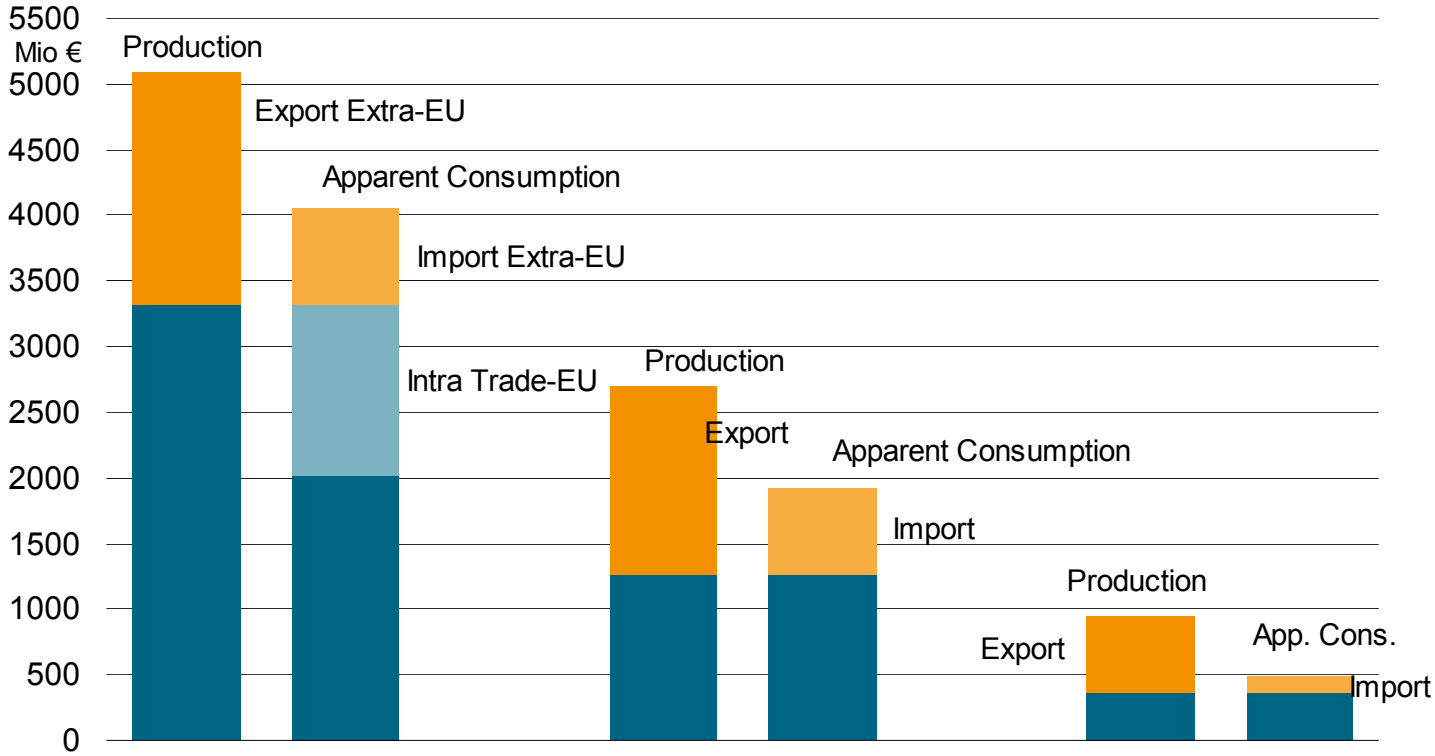
Production of Industrial Furnaces and Burners in the EU, 2001



Total volume of production: 5.011 Mio €

Source: VDMA

Production and Apparent Consumption of Industrial Furnaces in the EU, USA and Japan, 2000

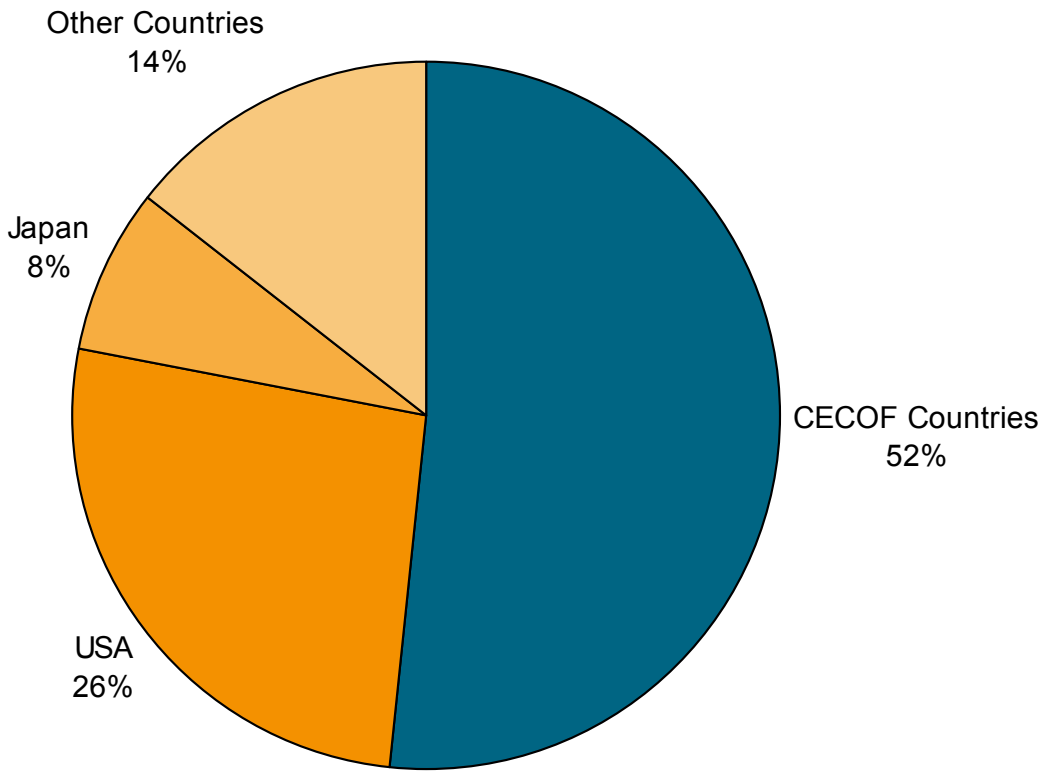


Source: VDMA

World Export of Industrial Furnaces and Burners, 2000

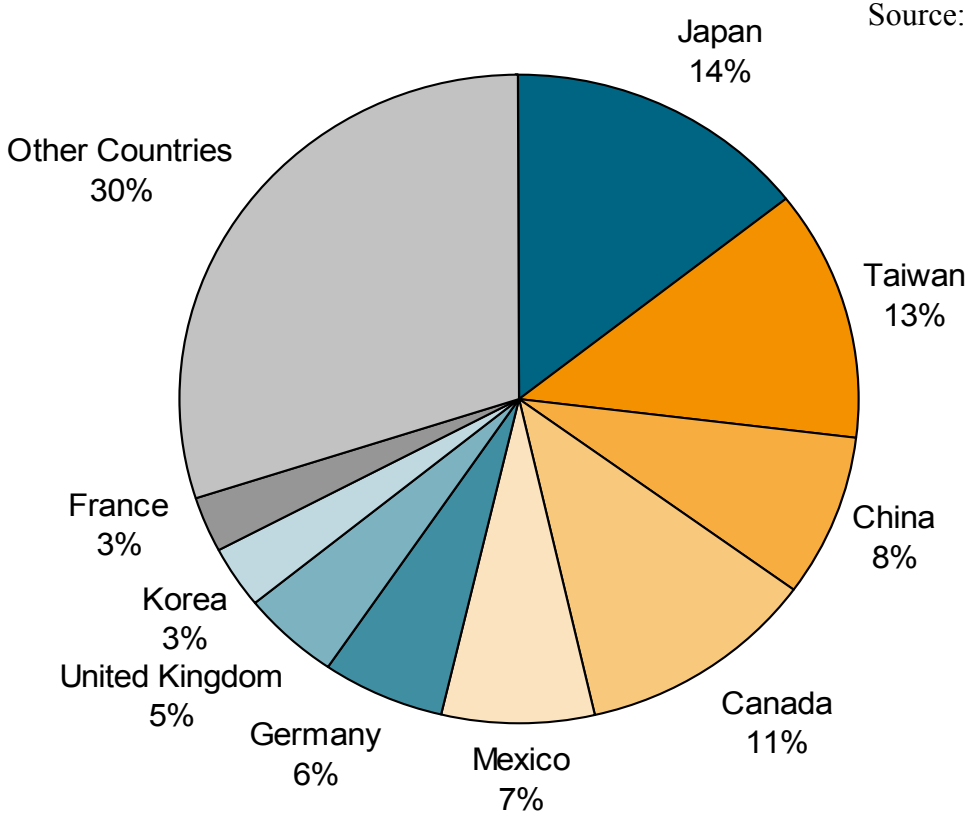
Total volume of world export: 4.991 Mio €

Source: VDMA



US Export of Industrial Furnaces and Burners by Destination, 2001

Total volume of export: 1.146 Mio. €
Source: International & VDMA Statistics



Current Situation

- Incremental gains
- Evolutionary changes

The application of technology focused on specific customer needs is the answer to ensure survival.

Back to Basics

- Improve efficiency and increase customer satisfaction:
  - Part sales
  - Refurbishment
  - Resale
  - Service

Customers are looking at repairing, rebuilding and upgrading existing equipment so it can be run in the most efficient manner and stay in production until the economy improves.

Back to Basics

- Reshuffle existing technology

Revisit:

– Existing mate
– Processes
– Find new use
– Incremental ir

1) Rebirth of cast iron as a viable engineering material and different heat treating techniques

2) Displacement of atmosphere carburizing with low pressure vacuum carburizing

3) Dramatic improvement in the image and use of salt and salt-bath equipment

Common Technology Needs

- Process Control and Sensors
- High Temperature Materials
- Design Tools
- Process Improvements
- Heating Transfer and Recovery
- Environmental Technologies

Technology Trends

- Change in the Heat Treatment Applications
  - Integration
  - Automation
  - New Process Technologies

Technology Trends

- Improve efficiencies, production, uptime, and reliability
- Reduce “Total Life Cycle” Cost

How:

- Timely introduction of new technologies in specific application niches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Technology Trend Examples

Aluminum Industry has become important to transportation advances:

- Weight reduction is critical in the automotive and aerospace industries

Process-heating innovations:

- New rotary pour spouts for tilting melters and holders
- Cold car designs for atmosphere annealing furnaces
- High-volume mixers for water-quench systems for solution heat treating furnaces

Technology Trend Examples

Copper Industry:

- US environmental regulations have forced manufacturers to change from aluminum to copper brazing

Steel Industry:

- Shifting from material development to improvements in manufacturing methods and efficiencies

Technology Trend Examples

Process-heating innovations:

- New high-efficiency, low-emissions radiant tube burners
- Smaller more flexible systems (atmosphere and vacuum furnaces, induction equipment, or ovens)
- High gas pressure quenching and low pressure vacuum carburizing

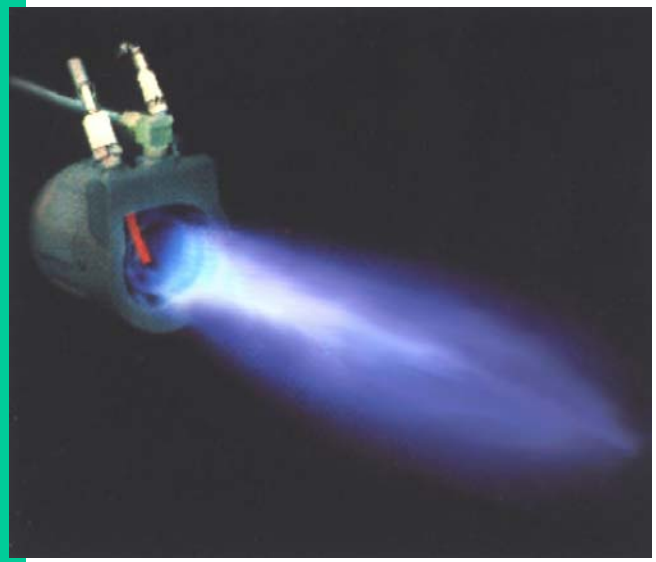
Survival in the 21st Century

Process heating technologies must:

- Reduce energy consumption
- Reduce process times
- Reduce production costs and emissions
- Improve reliability and maintainability
- Improve product quality
- Reduce distortion
- Improve product quality
- Improve uniformity
- Price-competitive

Thermal Technology

Thermal Technology



Survival in the 21st Century

- New materials and processes will compete with heat treating based on economic justifications
- Major advancement of control systems capable of real-time process analysis
- Computational fluid dynamics (CFD) modeling will optimize furnace designs
- Future is dependent on process optimization and improvements in thermal efficiency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